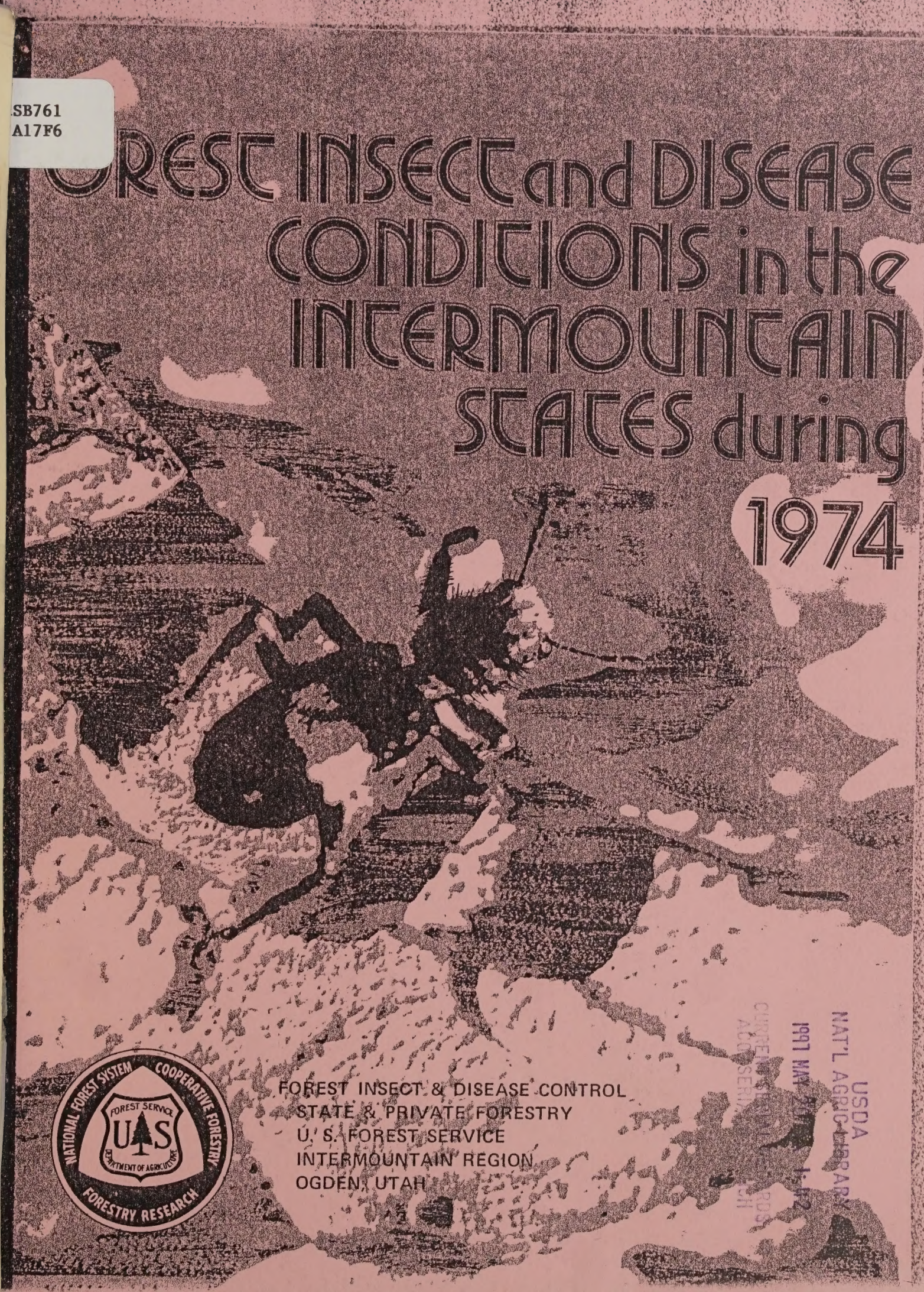
FOREST INSECT and DISEASE CONDITIONS in the INTERMOUNTAIN STATES during 1974



FOREST INSECT & DISEASE CONTROL
STATE & PRIVATE FORESTRY
U. S. FOREST SERVICE
INTERMOUNTAIN REGION
OGDEN, UTAH

STATUS OF FOREST INSECT AND DISEASE CONDITIONS AND PROGRAMS

in the Intermountain Region

1974

Forest Insect and Disease Control
State and Private Forestry
Region Four Forest Service
U.S. Department of Agriculture
324 25th Street
Ogden, Utah 84401

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RESUMÉ OF CONDITIONS

ENTOMOLOGY

Bark beetles continued to be the most important group of forest insects in Region 4 during 1974. Of this group, the mountain pine beetle in lodgepole pine is the most destructive and widespread with the single most damaging infestation persisting on the Targhee National Forest, Idaho. Although most of this long-standing outbreak has subsided, significant tree losses still occurred in the Island Park area and on the Moose Creek Plateau. To the immediate east, in Grand Teton National Park and Bridger-Teton National Forest, Wyoming, widely-scattered tree killing continued, particularly in the north end of the Park, and in the lower reaches of the Gros Ventre drainage. Localized but relatively intense outbreaks persisted in parts of the Sawtooth and Caribou National Forest, Idaho.

In northern Utah and southwestern Wyoming, outbreaks of increasing potential were evaluated in parts of the Ashley and Wasatch National Forests. In the Charlies Park area, Ashley Forest, a timber sale is planned to salvage dead and infested lodgepole pine and to slow the beetle's progress into adjacent uninfested stands. A mixed lodgepole-ponderosa pine outbreak continued in and surrounding Flaming Gorge National Recreation Area. On the neighboring Wasatch Forest, beetle populations continued to decline in the Weber and Provo River drainages, but increased on the Evanston Ranger District. In the ponderosa pine stands, widely-repeated outbreaks of the mountain pine beetle continued near McCall and Cascade, Idaho, and Bryce Canyon National Park and Dixie National Forest, Utah. Jeffrey pine, in conjunction with ponderosa and lodgepole pine, are under attack in widely-spaced areas on the Toiyabe National Forest, California.

Douglas-fir beetle attacks continued in parts of southern Idaho in 1974. The five-year-old outbreak on the Targhee Forest is expected to decline but not without continuing tree losses. Although the serious infestation on the Boise National Forest continued its downward trend, heavy tree losses are still occurring in localized areas, notably in Silver Creek and along the Middle Fork of the Payette River.

Bark beetles of lesser importance but of local significance are the Engelmann spruce beetle and the pine engraver beetle. In Utah, a lack of suitable host trees was primarily responsible for a decline in spruce beetle numbers in Huntington Canyon, Manti-LaSal National Forest, Utah. A trap-tree program was started in Deer Valley, Dixie Forest, in an attempt to reduce a potentially damaging outbreak in an old timber sale area.

Defoliators were the next important group of forest insects. Of these, the western spruce budworm defoliated large areas of Douglas-fir-true fir type on the Boise, Payette, Salmon, and Targhee National Forests in Idaho; the Bridger-Teton Forest in Wyoming; and to a small extent, the Ashley Forest in Utah. The increase in defoliated area over that reported in 1973 is thought to be the result of unseasonably high June temperatures and low precipitation which is favorable to budworm larval development and survival. Evaluation survey data indicate little overall change in the Idaho infestation during 1975 but increasing populations and foliage damage in portions of the western Wyoming outbreak.

A small outbreak of the Douglas-fir tussock moth on the Sawtooth Forest, Idaho, was controlled by helicopter application of DDT. Pine butterfly populations on the south bank of the Salmon River declined as expected. A variety of other defoliating pests were of local concern but otherwise not of Regional significance.

PATHOLOGY

An investigation was made to determine if mountain pine beetle-killed lodgepole pine trees remain sound enough to be utilized as power distribution poles. Even though some sap-rot occurred on all trees sampled it did not extend beyond about 6 feet up the trunk. It appears that lodgepole pine killed by mountain pine beetle may be utilized for power poles.

Dwarf mistletoe continued to be the most serious disease on conifers in the Intermountain Region. However, no new Forest Pest Control financed projects were conducted. Post-control evaluations of projects involving sanitation-thinning and overstory removal indicate a significant reduction in dwarf mistletoe was achieved. A study was conducted to determine if Douglas-fir dwarf mistletoe impact is correlated with the site. No correlation was observed on the basis of the plots taken.

Vegetation plots for monitoring SO_2 damage near the Navajo and Huntington Canyon generating plants revealed no damage this year.

Two new *Fomes annosus* infection centers were found on subapline fir and one probable site on ponderosa pine. *Cytospora* sp. has been noted occurring on subalpine fir apparently weakened by *Fomes annosus.*

Fomes applanatus caused death and windthrow of aspen at two locations in the Uinta and Wasatch National Forest.

A die-back of desert ash was observed in Zion National Park. *Alternaria* sp. was isolated from the dead tips. This is considered to be only a temporary, chance occurrence. Oak anthracnose was found in Gambel oak along the Wasatch Front.

ENTOMOLOGY

Bark Beetles

Mountain pine beetle, *Dendroctonus ponderosae* Hopkins

Lodgepole pine

The mountain pine beetle in lodgepole pine, although on the decrease Regionwide, still maintains its status as the Region's most serious and destructive insect. The current infestation, for all practical purposes, began in the late 1950's on the Wasatch Forest in northern Utah, spread in extent into nearby areas, developed anew in others, and by the mid 1960's, encompassed most of the lodgepole pine throughout northern Utah, southern Idaho, and western Wyoming. Suppression was attempted utilizing almost every conceivable technique, including spraying the standing trees with chemicals, fall and spray, fall and burn, standing burning, chaining over and burning entire stands, and logging. These efforts were largely unsuccessful, partly because of the scope of the problem, and partially due to our inability to harvest imminently threatened stands where temporary holding actions were maintained. Infestations of variable potential continued to persist in portions of northern Utah, western Wyoming, southern Idaho and eastern California.

The single most damaging outbreak continued on the Targhee Forest in southeastern Idaho. The long-standing outbreak in the southern half of the Forest has almost completely subsided, but increasing populations persisted in and adjacent to many of the abandoned control areas in the Island Park Ranger District. Cruise data from seven campgrounds showed a 1974 infestation level (new attacks) of from 4 to 20 trees per acre. Tree killing will intensify in the Island Park area for several years and continue northeasterly through the Moose Creek Plateau, the Madison Plateau in Yellowstone National Park, and onto the Gallatin National Forest.

Tree attacks on the Moose Creek Plateau have probably reached a peak and will begin to subside in 1975. Results of an annual trend survey using 35mm aerial color photography showed a general infestation level of 0.66 trees per acre in 1971, 2.74 trees per acre in 1972, and 3.14 trees per acre in 1973. A cursory ground examination, in conjunction with the aerial photo ground truth survey, showed a 1974 attack rate of 4.18 trees per acre. This relatively low infestation level is probably due to: (1) the relatively high elevation (7000 to 8000 feet), (2) low stand density and poor tree vigor, and (3) an extensive timber harvest program.

Mountain pine beetle populations on the adjacent Bridger-Teton Forest and Grand Teton Park, Wyoming, with a few exceptions, were at their lowest level during the past 15 years. Many red tops are known to exist in the corridor between Grand Teton and Yellowstone Parks, but were not aerially mapped due to poor visibility caused by heavy and enduring smoke from a large forest fire.

Heavy tree losses of decreasing intensity continued in Ditch, Turpin, Horsetail, and Slate Creeks in the lower Gros Ventre drainage with increasing and widely-scattered activity underway in the South Fork of Fish Creek. Farther south, in the Greys River, tree killing was at a standstill in the lower reaches of the River while persistent but widely-spaced attack centers continued in the upper reaches between Deadman and Ridge Creeks. Although not aerially surveyed, moderate tree killing continued along the west slope of the Wind River Range.

Heavy tree losses continued on the Cassia Division, Sawtooth Forest. During the 1974 aerial surveys, heavy tree fading was observed throughout most of

the lodgepole pine type. Widespread beetle populations are expected to continue for at least another season. No on-the-ground evaluations were made in 1974.

In the past, attempts have been made to salvage dead and dying trees through minimum stumpage sales. Little interest has been shown by industry in buying these sales due to the low quality of the timber and excessive haul distances to mills. In consideration of these factors, land managers have felt that values are not sufficient to warrant direct control consideration.

On the Northern Division of the Sawtooth Forest the mountain pine beetle remained epidemic in Warm Springs Creek and its tributaries west of Ketchum, Idaho. Also, new attack areas and expansion of old areas were recorded along the North Fork of the Big Wood River from Ketchum to Galena Summit. Many large trees remain that should provide suitable host material for continued beetle activity.

In the spring of 1971, direct control of a localized mountain pine beetle outbreak in and around Wildhorse Campground, Challis National Forest, was undertaken. Over 400 trees were felled and burned. In 1974, approximately 30 infested trees were found, somewhat less than the previous year. This slow attrition of the stand will continue until most of the susceptible trees are depleted. However, the infestation has been slowed and the trees that are being lost now are being utilized effectively as firewood for campers in the area.

In northern Utah and southwestern Wyoming in portions of the Ashley and Wasatch Forests, outbreaks of varied status now exist. On the Ashley Forest, south of Vernal, Utah, there is serious tree killing with increasing potential in the Charlies Park area. Efforts are now underway to salvage dead and infested timber in the outbreak area and to harvest imminently threatened timber in the path of the advancing infestation. On the opposite side of the Uinta Range, in the Flaming Gorge Area, the long standing infestation in mixed lodgepole and ponderosa pine stands continued. Increased mountain pine beetle activity was recorded on the west edge of the infestation adjacent to the Wasatch Forest boundary—where it is expected to encroach—and along the extreme eastern part in the Spiers Peak area. Elsewhere the infestation is static to declining. Salvage logging continues in the Ute Mountain—Long Park areas.

Depletion of lodgepole stands by the mountain pine beetle in and adjacent to old control areas continued in the western half of the Wasatch Forest in the Uinta Range. Heaviest activity was in the upper Bear River, Black Forks, Weber, and Provo River drainages. With the exception of the widespread outbreak in the upper Bear River, all other infestations are on the decline.

Widely-separated tree mortality continued in portions of the Caribou Forest, Idaho, with a serious outbreak in progress in Diamond Creek. Forest personnel reported a 1974 attack level of 26 trees per acre. Plans are to salvage most of the dead and infested timber by 1975.

Ponderosa pine

The mountain pine beetle continued to kill both ponderosa and lodgepole pine in and near McCall, Idaho. From 1960 to 1965, the infestation spread from the North Fork of the Payette River near McCall, southward to Cascade Reservoir. In 1966, new attacks were observed throughout Long Valley and Round Valley. Since then tree killing has continued in both Valleys.

During the past two years, new tree attacks have been detected in and around the town of McCall, indicating a resurgence of activity in the old Payette River infestation. As before, both ponderosa and lodgepole pine are being affected.

Since 1964 the mountain pine beetle has attacked and killed large numbers of small, stagnated, second-growth ponderosa pine in the Warners Pond area southeast of Cascade, Idaho on private lands. Until the past two years, losses have been primarily in small dbh trees; however, as these are becoming fewer in number, larger trees (10" dbh and over) are being killed. Considerable numbers of host trees remain and the infestation is expected to continue for at least another year.

The persistent outbreak in mixed ponderosa and lodgepole pine stands in and adjacent to the Flaming Gorge National Recreation Area continued, but with decreasing intensity. Mortality is limited to a few large open-grown trees, and dense, stagnated second-

growth. The long standing outbreak in Bryce Canyon National Park and Dixie Forest continued to decline. Widely scattered killing of individual trees and trees in small groups continued in portions of the Cedar City and Escalante Ranger Districts, Dixie Forest.

Jeffrey pine

At a low level for several years, mountain pine beetle activity in Jeffrey pine showed sizeable increases in portions of the Toiyabe Forest, California. In many areas beetle attacks were also occurring in ponderosa and lodgepole pine. The largest concentration of this mixed host activity is in the inaccessible reaches of Silver King Creek in the south end of the Carson Ranger District. The status of these infestations is unknown.

Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins

The Douglas-fir beetle is the most important enemy of Douglas-fir in the Intermountain Region. The most serious infestations occurred in portions of the Boise and Targhee Forests, Idaho, with significant but less damaging tree killing occurring in parts of the Payette, Challis, and Sawtooth Forests, also in Idaho.

Although considerably under the epidemic levels of 1968 to 1970 heavy beetle activity continues in two areas of the Boise Forest. Mature and overmature Douglas-fir stands along Silver Creek and adjacent drainages of the Middle Fork of the Payette River, and a 20-mile band from Lowman to Grandjean, Idaho were suffering heavy mortality.

Foresters on the Boise Forest have determined that the Douglas-fir stands in the 20-mile band along the South Fork of the Payette River are incurring intolerable losses. Helicopter sales are being considered for logging the extremely steep slopes. Logging the larger, over-mature and mature stands will reduce beetle impacts and convert the stand to a less susceptible condition.

A joint adminsitration-research study is underway in the Silver Creek area, Boise Forest, to determine environmental impacts of logging and other management practices. It is hoped that some knowledge can be gained on the effects of these activities in relation to bark beetle populations where logging is not primarily directed at suppression or salvage. Also, information will be gathered on effects of bark beetles on residual stand values.

On the Targhee Forest, Douglas-fir beetle activity increased in 1974, but showed signs of lessening in 1975. The most striking increases were recorded during aerial surveys in Meadow Creek, Baker Draw, Flat Canyon, Anderson Mill Canyon, Coleman Canyon and north of Palisades Reservoir. However, the outlook for 1975 is somewhat encouraging. A decrease in the ratio of new to old attacks (0.94:1) was recorded during a biological evaluation survey. Although slight, this is the first recorded decrease since the beetle attacked standing green trees in 1970. This decline was forecast in 1973, based primarily on the beetle's inability to increase its numbers for more than 3 to 4 years in standing live trees. Although the outbreak has reached its peak, tree killing will continue for several years, but at a decreasing rate.

Engelmann spruce beetle, *Dendroctonus rufipennis* (Kirby)

The only significant spruce beetle activity in the Region during 1974 was in Utah. The damaging infestation in Huntington Canyon, Manti-LaSal Forest, took a turn for the better and experienced a sharp decline. The primary reason for this significant reversal was a lack of suitable host trees. Decreasing beetle activity was predicted in 1973 following ground cruises of some of the affected stands. These data showed volume losses ranging from 25 to 80 percent of the stands. Logging to salvage some of the dead and dying material has been unsuccessful because of limited mill capacity and a poor lumber market. Nonetheless, efforts to salvage much of this dead but sound material will continue.

Renewed spruce beetle activity was found in the Deer Valley timber sale on the Dixie Forest. Heavy tree killing occurred within many of the long, narrow leave strips. The upsurge was thought to be caused by windfall along the margins of the exposed residual stand, rather than due to excessive logging debris. An aggressive trap-tree program involving some 550 widely-spaced trap trees was undertaken. Data to determine the effectiveness of the program will be collected before the traps are removed in the fall of 1975.

Pine engraver beetle, *Ips pini* (Say)

A perennial and highly fluctuating problem, the pine engraver beetle dropped to a relatively low level in 1974. Although the range of this secondary bark beetle is Regionwide, it has been more destructive to second-growth ponderosa pine in southern Idaho than in other locales. Its favorite breeding material is fresh, shaded slash left in logging and thinning areas.

Slash produced in one logging area and in two thinning areas on the Boise Forest was treated during 1973 with a lindane oil formulation. An evaluation of treatment efficacy in 1974 showed that the lindane had successfully protected the residual stand in all areas.

In another timber sale area on the Boise Forest, early logging (January) and an accumulation of slash, partly caused by unfavorable burning conditions, precipitated summer attacks in the nearby residual stands. Attacked ponderosa pine ranged in size from 7 to 25 inches dbh. Some western pine beetle, *Dendroctonus brevicomis* LeConte, broods were intermixed with *Ips,* but thought to be only incidental.

Defoliators

Western spruce budworm, *Choristoneura occidentalis* Freeman

Popluations of the western spruce budworm continued to defoliate Douglas-fir, grand fir, subalpine fir and to a lesser extent, Engelmann spruce, in the Intermountain Region. The present infestation level of slightly more that 350,000 acres is an increase over that recorded in 1973, but still under the extensive acreage infested a decade ago (Table 1). The year of heaviest budworm activity was in 1964 when some 2,276,000 acres were infested with more than 1,300,000 acres falling in the heavy defoliation category. 1964 was also the year of the last DDT aerial spray project in the Region when 525,000 acres were sprayed on the Salmon Forest. Since then natural factors have reduced the infestations and maintained them at tolerable levels.

The two most enduring western spruce budworm outbreaks occurred in portions of the Payette and Boise Forests, Idaho, and the Bridger-Teton Forest in Wyoming. Less evident and considerably smaller infestations were reported in parts of the Salmon and Targhee Forests, Idaho, and the Ashley Forest, Utah (Table 2).

The infestations in southern Idaho and western Wyoming were more widespread than predicted in 1973 following the fall egg mass evaluation survey. Although there was an overall decrease in the area receiving heavy defoliation, there was a singificant increase in the extent of light and moderate feeding damage.

Table 1. Area defoliated by the western spruce budworm during the past eleven years as determined by aerial reconnaissance.

	DEFOLIATION INTENSITY (ACRES)			
Year	Light	Medium	Heavy	Total
1964	266,000	658,000	1,352,000	2,276,000
1965	465,600	254,500	795,200	1,515,300
1966	923,900	52,200	16,100	992,200
1967	162,200	54,900	1,600	218,700
1968	333,500	150,200	21,800	505,500
1969	388,800	125,400	30,200	544,400
1970	223,200	79,300	5,200	307,700
1971	229,300	110,300	34,300	373,900
1972	395,300	100,700	9,500	505,500
1973	99,700	76,400	48,000	224,100
1974	234,900	111,300	11,600	357,800

Table 2. Distribution and areas of major western spruce budworm infestations in the Intermountain Region during 1974.

Forest	DEFOLIATION INTENSITY (ACRES)			
	Light	Medium	Heavy	Total
Ashley	400	–	–	400
Boise	114,400	7,200	–	121,600
Bridger-Teton	17,800	1,100	–	18,900
Payette	95,200	102,000	11,600	208,800
Salmon	6,600	–	–	6,600
Targhee	500	1,000	–	1,500
TOTAL	234,900	111,300	11,600	357,800

The reason for this unexpected rise in noticeable foliage damage is believed to be caused by abnormal weather conditions—high temperatures and low precipitation—during June, which is known to be favorable to rapid larval development and high survival. Weather bureau summaries for June 1974, for example, listed a 5.1 degree mean temperature increase and a 46 percent precipitation decrease for the Snake River drainage, Wyoming, and a 5.1 degree mean temperature increase and a 73 percent moisture decrease for the eastern highlands region in Idaho.

On a Regional basis, budworm populations should increase slightly in 1975, with some variation between areas. Egg mass survey data indicate that the Payette infestation, with some localized variation, should remain essentially unchanged, while the outbreak on the Bridger-Teton Forest will increase in intensity and area. Barring unforeseen natural control factors, moderate to heavy defoliation will be visible on Storm King Mountain—scenic backdrop to Jackson—and along the Grand Canyon of the Snake River. Very limited or no biological data were taken from the Boise, Targhee, and Ashley infestations; consequently their status is unknown.

Douglas-fir tussock moth, *Orgyia pseudotsugata* (McDunnough)

In June 1973, Forest Service and other personnel reported defoliation of Douglas-fir between Featherville and the Little Wood Reservoir, Idaho. Followup ground and aerial surveys showed 11,000 acres of tussock moth damage on mixed State, Federal and private lands. Evaluation surveys made throughout the damaged area, pinpointed only one area near Fairfield as having potential tussock moth populations. Subsequent surveys in the spring of 1974 showed sufficient egg masses were present on 1,200 acres to cause significant defoliation in 1974.

As part of the westwide co-ordinated Douglas-fir tussock moth control project, the 1,200 acre area was treated by helicopter with 0.75 pounds of DDT dissolved in one gallon of solvent and fuel oil per acre. A postspray analysis showed that tussock moth larval populations were reduced below prespray levels and that some foliage was saved.

The small isolated infestation in white fir, *Abies concolor* (Gord. & Glend.) Lindl., in the Charleston Mountains, Toiyabe Forest, Nevada, declined to a low level. In areas of past damage, 1974 defoliation was relatively heavy, particularly on the understory trees. Some heavily mistletoed trees succumbed from repeated heavy defoliation and bark beetle attacks, Very few new egg masses were deposited indicating lessening activity for 1975.

Pine butterfly, *Neophasia menapia* (Felder & Felder)

Defoliation of ponderosa pine by the pine butterfly, first reported along the south side of the Salmon River, Payette Forest, in 1971, reached a peak level of more than 8,000 acres in 1973, and is now on the decline. A 1973 biological evaluation showed a reduc-

tion in the number of egg masses and a sharp increase in larval and pupal parasitoids. A followup examination in 1974 indicated that the population had collapsed, at least for the present time. No defoliation was visible either from the air or ground.

A tent caterpillar, *Malacosoma incurvum discoloratum* (Neumoegen)

Populations of this voracious tent caterpillar, at a low level for several years, increased in one localized area in Capitol Reef National Park, Utah. Its preferred host is Fremont cottonwood, *Populus fremontii* S. Watson, although herbacious understory is fed on occasionally. Defoliation was spotty, but numerous tents and heavy defoliation occurred on several trees east of the Visitors Center along the main highway. However, all trees refoliated with no apparent long term injury. Egg mass survey data indicate light and highly variable defoliation for 1975.

A sawfly, *Neodiprion fulviceps* (Cresson)

For the past five years, this sawfly has been active in a small isolated area in Clear Creek, Fishlake National Forest, Utah. Although less than 50 medium-sized ponderosa pine are involved, practically all trees have received repeated heavy defoliation. Larval populations, on a gradual decline since 1971, were light in 1974, but still numerous enough to again cause significant defoliation of the heavily stressed trees. Rather surprising, however, is the fact that the trees continue to survive in spite of the persistent feeding (Figure 1). The trend of the infestation will be closely followed to observe and record the long-term impact of this sawfly on the host trees.

White fir needle miner, *Epinotia meritana* Heinrich

The long standing outbreak of this defoliator in portions of Bryce Canyon National Park and adjoining Dixie Forest continued its slow but steady attrition of white fir, *Abies concolor* (Gord. and Glend.) Lindl. Although populations are not as high as in previous years, there were larvae in sufficient numbers to cause noticeable defoliation to the already heavily damaged trees. In some areas widely-scattered tree mortality has occurred; in others many of the heavily damaged trees appear to be recovering (Figure 2).

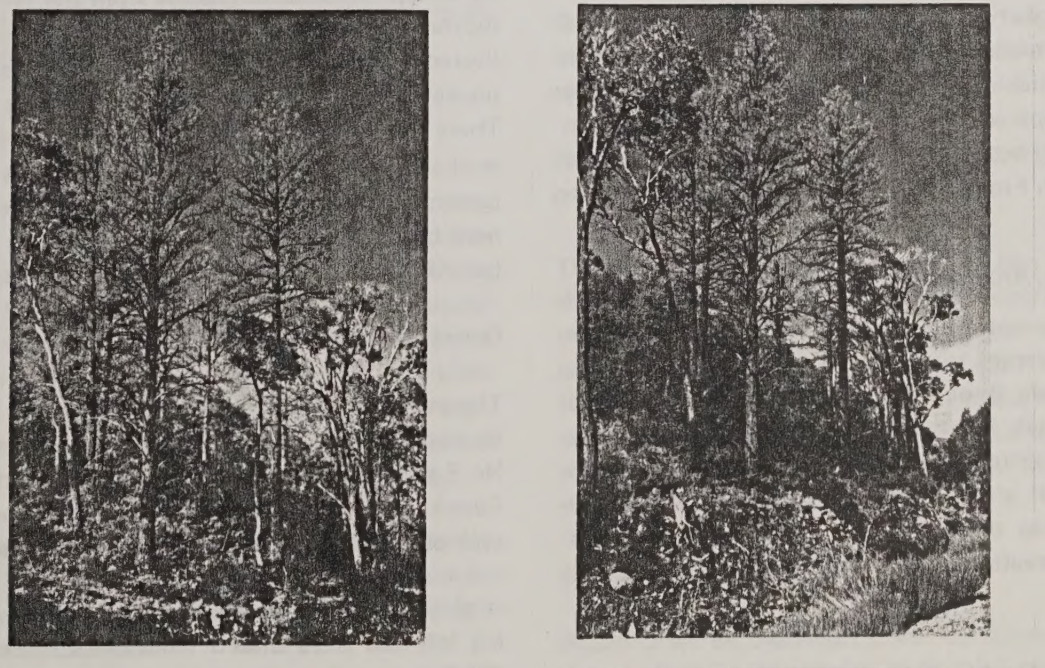

Figure 1. Ponderosa pines receiving several years of successive, heavy defoliation by a pine sawfly, *Neodiprion fulviceps*, Fishlake National Forest. Left, 1971, right, 1974.

Figure 2. White fir, *Abies concolor* defoliated by the white fir needle miner, Dixie National Forest.

Fall cankerworm, *Alsophila pometaria* (Harris)

The fall cankerworm caused moderate to heavy defoliation on much of the oak and maple in lower Corn Creek, Fishlake Forest, Utah. Trees refoliated quickly with no apparent damage. Other scattered defoliation primarily of boxelder and Gambel oak occurred along the Wasatch Front. The trend of this infestation is unknown.

A leafroller, *Archips negundanus* (Dyar)

For the seventh consecutive year, this leafroller caused moderate to heavy defoliation of boxelder, *Acer negundo* throughout much of the rural areas in northern Utah. Despite heavy defoliation for so many years, no apparent damage and/or mortality has been recorded. Of greatest concern is the nuisance caused by the larvae dropping from trees near homes and high-use recreation areas.

PATHOLOGY

Utilization Study of Mountain Pine Beetle-Killed Lodgepole Pine

In the spring of 1974 a study was undertaken on the Ashton Ranger District, Targhee Forest, to determine if lodgepole pine killed by the mountain pine beetle could be utilized as power distribution poles. The objective of the study was to determine whether sap and heart rotting fungi cause decay and consequent weakness significant enough to prevent dead trees from being used.

Forty-six plots were established along four roads. Data from the BAF 10 variable diameter plots were expanded to a per-acre basis. There were an average of 12.7 live lodgepole pine per acre over 11 inches dbh in the area sampled. Dead, noncommercial pole-sized trees averaged 16.2 per acre. There were 16.3 commercial quality poles per acre but of these, 3.9 were culled due to decay and other defects. Of the dead pole-size trees still standing, 38 percent (12.4 per acre) met commercial pole standards.

Some other important findings were that every tree had serious sap-rot 3 to 6 feet above the stump, depending on the length of time since death. Moisture content at stump height was as high as 60 percent but decreased rapidly in the first 16-foot log. Beyond the 16-foot height, moisture content was very consistent (between 12 and 15 percent). Of the trees which met pole standards, approximately 24 percent were culled by decay. Subsequent reports from the pole yard indicate that some of the dead pole quality logs delivered to the yard for peeling and treating had pockets of red rot behind sound appearing branches. These tear out during peeling. These logs are then not marketable as power poles. This defect is probably present in both live and dead trees. Dead trees which have been cut and used as power poles have proven to be satisfactory.

Dwarf mistletoe, *Arceuthobium* spp.

The most serious disease of conifer species of the Intermountain Region continued to be dwarf mistletoe. No Forest Pest Control financed projects on National Forest land were conducted this year. Post-control evaluations of 13 previous years' projects revealed reduction in numbers of infected trees per acre ranged from 69 to 90 percent, with almost all remaining infected trees Class I (Hawksworth and Lusher, 1956).[1]

[1] Hawkworth, Frank G., and Arthur A. Lusher. 1956. Dwarf mistletoe survey and control on the Mescalero-Apache reservation, New Mexico. J. Forest. 54(6):384-390

The control method is sanitation-thinning in the regeneration. The noncommercial overstory is killed, usually by girdling. Most project work has, so far, been conducted in lodgepole pine stands. A few projects have been in Douglas-fir.

During the past several years, the Regional Ecologist, two foresters and the Regional Pathologist independently observed that Douglas-fir dwarf mistletoe impact seemed to decrease as site quality increased. Some preliminary sampling was done to determine if this relationship actually existed and if it warranted further study. Data taken systematically on various Douglas-fir habitat types revealed no apparent correlation between infection impact and habitat type. Results were confounded by selection logging which had taken place in past years. Selection logging had left decadent trees which were overstory sources of infection resulting in infection in the tops of regeneration. Because this practice was so widespread, it was impossible to obtain data from undisturbed stands. Personnel of the Intermountain Forest and Range Experiment Station involved in habitat typing in Idaho state they also can not find any correlation between Douglas-fir dwarf mistletoe impact and Douglas-fir habitat type. The habitat typing program is continuing. Data include levels of dwarf mistletoe infection by habitat type. In the future these data will be analyzed for possible dwarf mistletoe-habitat type correlations.

Air Pollution

The Navajo Generating Station, located at Page, Arizona, and the Huntington Canyon Generating Station, located about 20 miles south of Price, Utah, went "on line" in May 1974. Both plants are equipped with electrostatic precipitators which keep the fly ash emissions to a barely discernible plume. Release of SO_2 gas is unchecked. Spring and fall vegetation plot examinations around both power plants revealed no damage that could be ascribed to SO_2.

Annosus root rot, *Fomes annosus* (Fr.) Cke.

Preliminary sampling of subalpine fir exhibiting fading individual branches in their crowns revealed *F. annosus* root infection. A species of *Cytospora* was found apparently parasitizing the branches of such weakened trees.

Newly found infection centers in subalpine fir included one on the Mink Creek Road of the Wasatch Forest and another on the Powder Mountain ski area near Ogden, Utah. In both of these centers the infection court appeared to be stumps created by man. Areas of dying ponderosa pine were examined on the Boise Basin Experimental Forest. *F. annosus* was found killing a sawlog-sized tree in one of them. Whether other mortality noted was caused by *F. annosus* could not be determined.

Applanatus root rot, *Fomes applanatus* (Pers. ex Wallr.) Gill.

Examination of dying and windthrown aspen in four campgrounds along the North Fork of the Duchesne River, Uinta Forest, revealed the roots of these trees were being rotted by the fungus, *F. applanatus.* Crown symptoms exhibited by infected trees included leaves less than normal size and thinning foliage. However, some windthrown trees were examined that did not exhibit any crown symptoms. A similar condition was found in a campground in Logan Canyon on the Logan Ranger District, Wasatch Forest. Further study of this problem is planned.

Aspen twig and leaf blight, *Marssonia populi* (Lib.) Magn.

Regionwide the incidence of aspen twig and leaf blight was low in 1974, probably because the growing season was one of the driest on record.

***Rhabdocline* needle cast of Douglas-fir, *Rhabdocline pseudotsugae* (Syd.)**

The incidence of *Rhabdocline* needle cast was lower this year than in previous years. No reports were received from field personnel concerned about this problem. In years when the *Rhabdocline* needle cast flourishes, five to ten reports or requests for identification are usually received. It is felt that dry weather conditions during late spring restricted the infection of the new growth.

Aspen canker, *Cytospora* sp.

Aspen cover on the Angel Creek Campgrounds, Wells Ranger District, Humboldt National Forest, was reported dying. Examination revealed that each tree had multiple *Cytospora* cankers which girdled the

stem, killing the tree. The trees were growing on a very well-drained site. There was damage caused by recreationists to many of the stems and these wounds acted as infection courts. The prolonged drought during the growing season probably accelerated the rate of dying.

Die back of desert ash

A dieback of desert ash, *Fraxinus velutina*, in Zion National Park was investigated. The principal problem appeared to be drought. A fungus of the genus *Alternaria* was isolated from leaves and twigs. *Alternaria* is considered a weak parasite or saprophyte on plant material. The drought conditions probably predisposed the trees to invasion by this organism. After the trees were heavily watered, a new flush of growth occurred in the late summer.

Unknown deposits on leaves of singleleaf ash

Leaves of single leaf ash, *Fraxinus anomala,* exhibiting brown deposits and thinning were submitted to us from Arches National Park. Examination revealed these deposits to be water soluble. Chemical analysis determined that saccharides were present. The deposits were probably a form of aphid honey dew.

Anthracnose of ornamental oak, *Gnomonia veneta* (Sacc. and Speg.)

Gambel oak, *Quercus gambelii*, growing around three homes in Ogden and Farmington, Utah, were examined. The disease of the leaves was diagnosed as oak anthracnose. These trees were irrigated frequently. Unirrigated oak growing wild in the foothills were not diseased. The assumption as to why this disease occurred during a dry period is that irrigation provided moisture necessary for infection of this year's foliage. Impact upon growth caused by this organism is expected to be minor.

Ponderosa pine tip dieback

A tip dieback of ponderosa pine, *Pinus ponderosa,* that was prevalent from southern Utah to the Uinta Mountains with lesser levels of infection on ornamental pines in northern Utah has disappeared. An unidentified black fungus has been consistently isolated from infected tips.

Dying of pinyon pine

Dying of pinyon pine, *Pinus edulis,* centered at Monticello, Utah, was reported this year. Upon examination, no obvious pathogen or insect was found. Isolation from a light brown area in the cambium of one tree extending from a root up the trunk produced a slow growing grey-white fungus, identity unknown. The area of infection extends from Monticello east approximately 35 miles into Colorado, 15 miles south and 10 miles north, and westward to the lower slopes of the Abajo Mountains. The winter of 1972-73 was very cold, accompanied by high winds. The largest patches of mortality are on exposed points of land which extend out into the canyons. This mortality is probably attributable to winter kill brought on by frozen ground and high-velocity drying winds.